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(54) **WIRELESS BICYCLE COMPONENT CONTROL**

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See application file for complete search history.

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B62J 1/08 (2006.01)
B62K 23/06 (2006.01)
B62K 25/04 (2006.01)
B62L 3/02 (2006.01)
B62M 6/45 (2010.01)
B62J 45/00 (2020.01)

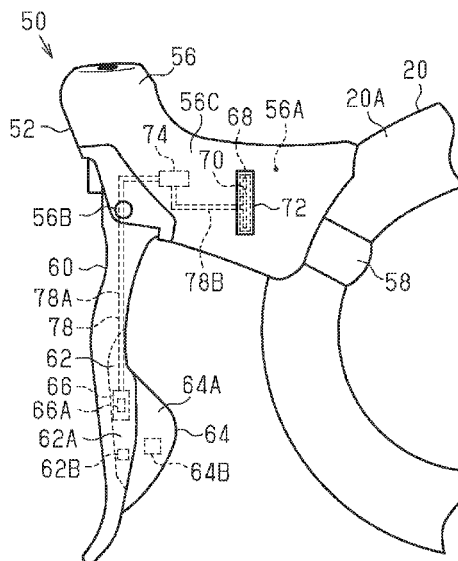
(52) **U.S. Cl.**

CPC **H04B 1/3827** (2013.01); **B62J 1/08** (2013.01); **B62K 23/06** (2013.01); **B62K 25/04** (2013.01); **B62L 3/02** (2013.01); **B62M 6/45**

(57) **ABSTRACT**

A bicycle component is provided that facilitates replacement of a communication device. The communication device bicycle component includes an operation member, a power generator, a communication device and an attachment portion. The power generator generates power in a state in which the operation member is operated. The communication device transmits a wireless signal with the power generated by the power generator. The attachment portion is attached to the communication device in a removable manner. The communication device is attachable to another attachment portion of another bicycle component in a removable manner.

22 Claims, 3 Drawing Sheets



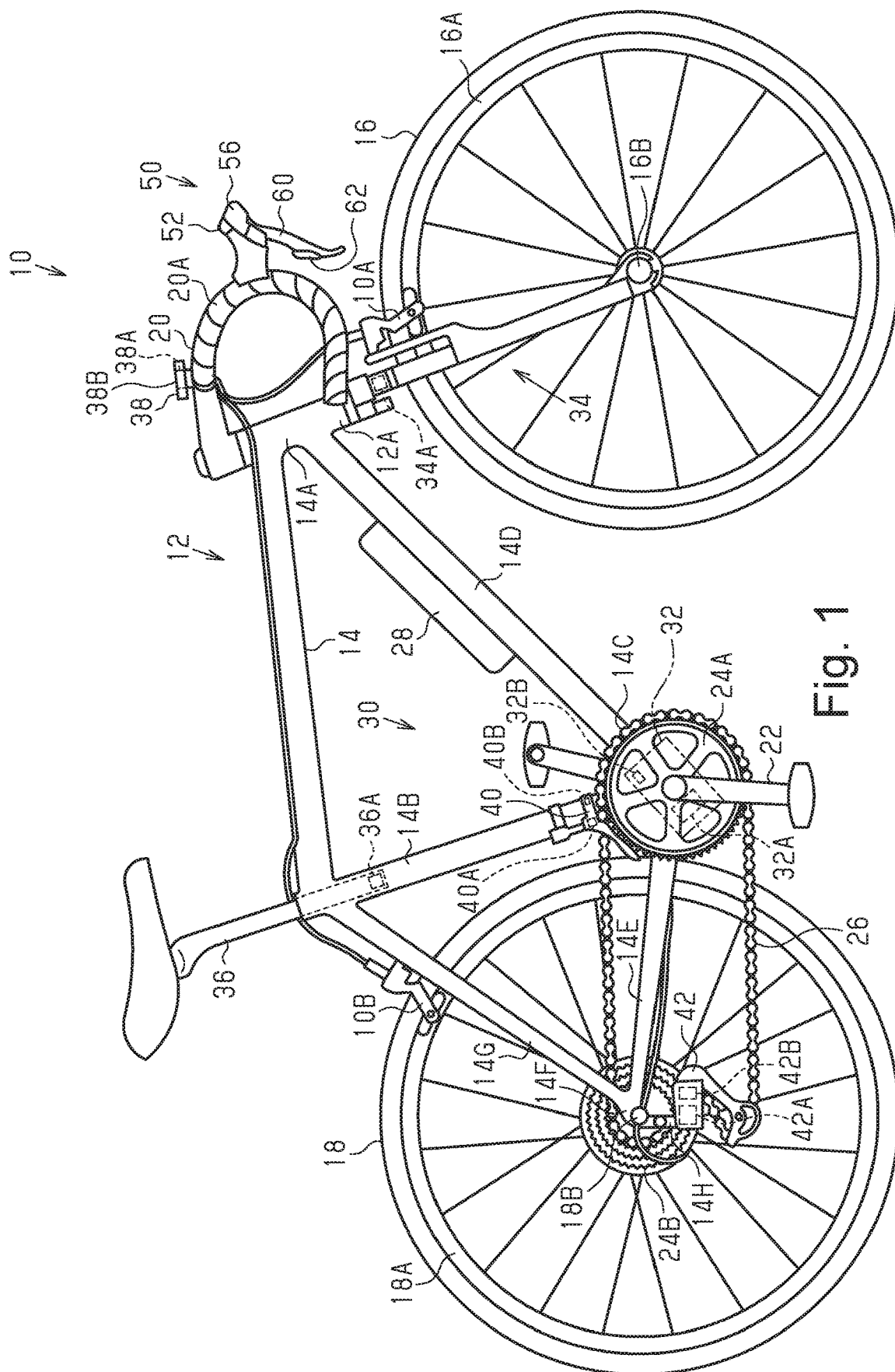
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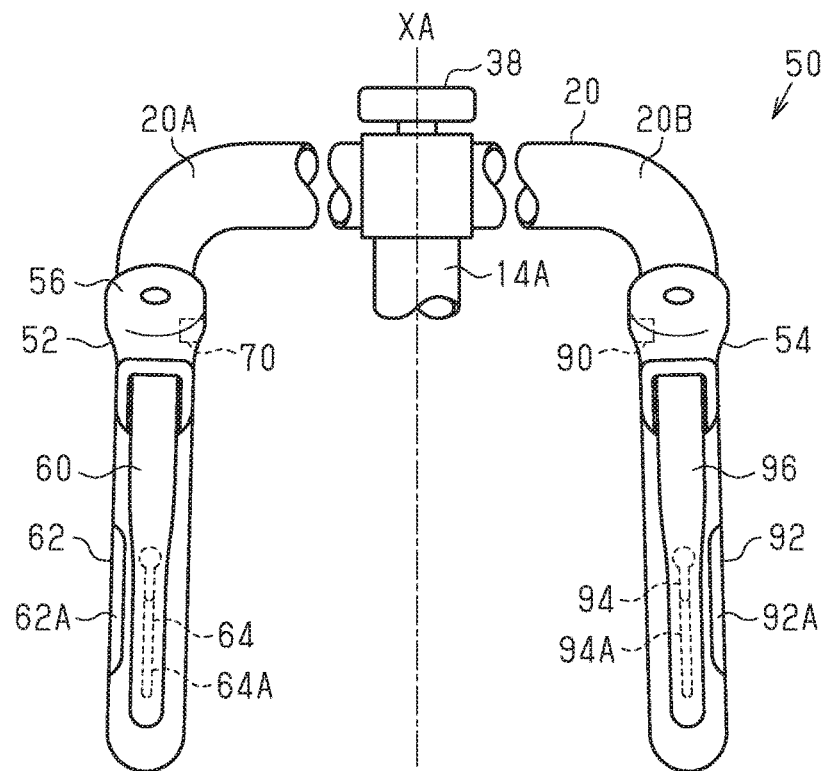


Fig. 2

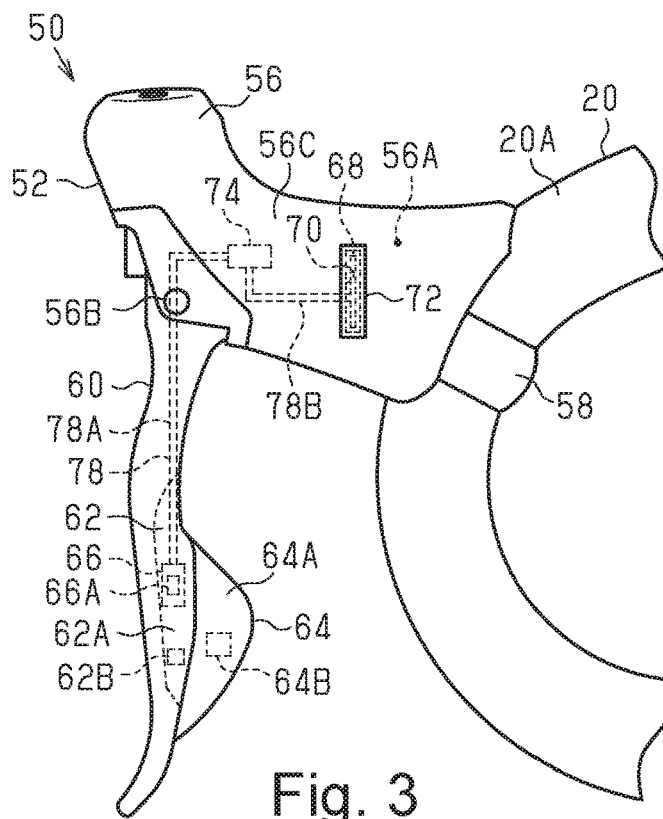


Fig. 3

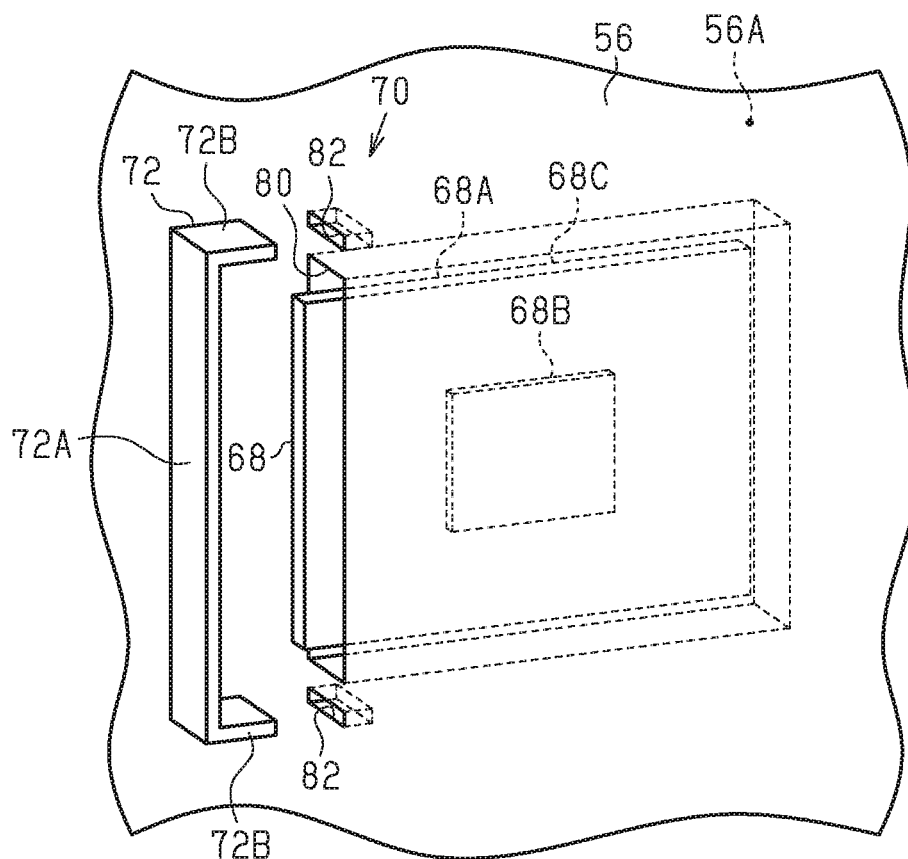


Fig. 4

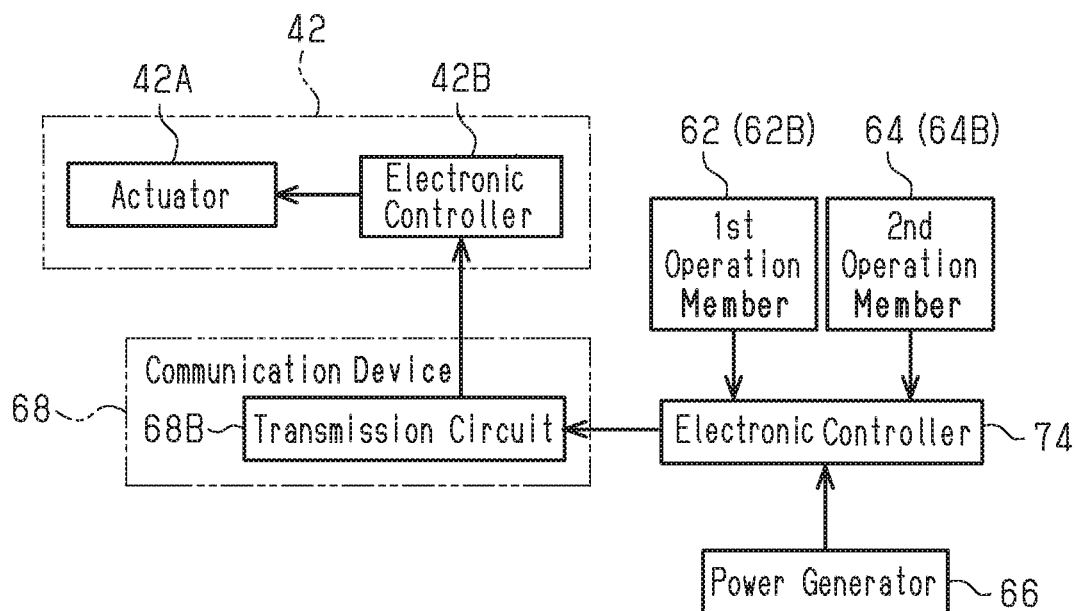


Fig. 5

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WIRELESS BICYCLE COMPONENT CONTROL

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims priority to Japanese Patent Application No. 2016-176709, filed on Sep. 9, 2016. The entire disclosure of Japanese Patent Application No. 2016-176709 is hereby incorporated herein by reference.

BACKGROUND

Field of the Invention

The present invention generally relates to a bicycle component and a communication device of a bicycle component.

Background Information

Japanese Laid-Open Patent Publication No. 2015-27861 (Patent document 1) discloses one example of a known bicycle component that includes a communication device configured to perform wireless communication.

SUMMARY

It is preferred that a communication device be easily replaced, for example, to update data of the communication device. It is an object of the present invention to provide a bicycle component that facilitates replacement of a communication device and a communication device of such a bicycle component.

In a first aspect of the invention, a bicycle component includes an operation member, a power generator that generates power in a state in which the operation member is operated, a communication device that transmits a wireless signal with the power generated by the power generator, and an attachment portion to which the communication device is attached in a removable manner. The communication device is attachable to another attachment portion of another bicycle component in a removable manner. Since the communication device is attachable to another attachment portion of another bicycle component in a removable manner, the communication device is easily replaced.

In a second aspect of the invention, in the bicycle component according to the first aspect, the attachment portion includes a recess into which the communication device is insertable. Thus, the communication device is guarded by the attachment portion.

In a third aspect of the invention, in the bicycle component according to any one of the preceding aspects, the communication device is configured to be attached to the attachment portion so that the communication device is at least partially exposed from the attachment portion. This limits interference of the attachment portion with travel of the wireless signal, which is transmitted from the communication device.

In a fourth aspect of the invention, the bicycle component according to any one of the preceding aspects further includes a base including an inner cavity. The attachment portion is arranged in the base so that the communication device is at least partially located in the inner cavity. This limits projection of the communication device out of the base.

In a fifth aspect of the invention, the bicycle component according to any one of the preceding aspects further

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includes a cover member attached to the base. The cover member covers the communication device. This limits damages to the communication device.

In a sixth aspect of the invention, in the bicycle component according to any one of the preceding aspects, the cover member includes a resin material. This limits interference of the cover member with travel of the wireless signal, which is transmitted from the communication device.

In a seventh aspect of the invention, in the bicycle component according to any one of the preceding aspects, the base is coupled to a handlebar of a bicycle. Thus, the communication device can be located in the vicinity of the handlebar of the bicycle. This allows the user to easily operate the bicycle component.

(8) In an eighth aspect of the invention, in the bicycle component according to any one of the preceding aspects, in a state in which the base is coupled to the handlebar of the bicycle, the attachment portion is located at a side of the base that is closer to a center of the bicycle.

Thus, the communication device, which is attached to the attachment portion, is located in the vicinity of the center of the bicycle. This limits interference of the user with travel of the wireless signal, which is transmitted from the communication device.

In a ninth aspect of the invention, in the bicycle component according to any one of the preceding aspects, the communication device includes a transmission circuit that transmits the wireless signal and a communication device body that includes the transmission circuit. This limits damages to the transmission circuit.

In a tenth aspect of the invention, in the bicycle component according to any one of the preceding aspects, the attachment portion includes a card slot. The communication device body has a form of a card that is insertable into the card slot. This allows the user to easily attach and remove the communication device.

In an eleventh aspect of the invention, in the bicycle component according to any one of the preceding aspects, the communication device body includes a housing. The transmission circuit is arranged in the housing. This limits damages to the transmission circuit.

In a twelfth aspect of the invention, the bicycle component according to any one of the preceding aspects further includes a connection portion that electrically connects the communication device and the power generator. The communication device is separated from the power generator. This increases the degree of freedom for arranging the communication device and the power generator.

In a thirteenth aspect of the invention, in the bicycle component according to any one of the preceding aspects, the wireless signal is a signal that controls operation of a bicycle component including an actuator. This eliminates the need of a wire for transmitting a signal to the bicycle component. Thus, the structure of the bicycle is simplified.

In a fourteenth aspect of the invention, in the bicycle component according to any one of the preceding aspects, the bicycle component including the actuator includes at least one of an electric shift device, an electric adjustable seatpost, an electric suspension, and an electric assist unit. This eliminates the need of a wire for transmitting a signal to at least one of the electric shift device, the electric adjustable seatpost, the electric suspension, and the electric assist unit. Thus, the structure of the bicycle is simplified.

In a fifteenth aspect of the invention, in the bicycle component according to any one of the preceding aspects, the communication device is attachable in a removable manner to an attachment portion of a bicycle component

including an operation member and to an attachment portion of a bicycle component including an actuator. Since the communication device is attachable to an attachment portion of a bicycle component in a removable manner, the communication device is easily replaced.

The above bicycle component and the communication device of the bicycle component facilitate replacement of the communication device.

BRIEF DESCRIPTION OF THE DRAWINGS

Referring now to the attached drawings which form a part of this original disclosure.

FIG. 1 is a side elevational view of a bicycle equipped with a bicycle component in accordance with one embodiment.

FIG. 2 is a front elevational view of a handlebar and a pair of bicycle component operating devices shown in FIG. 1.

FIG. 3 is a side elevational view of a right portion of the handlebar and a first bicycle component operating device shown in FIG. 2.

FIG. 4 is a perspective view of a communication device and an attachment portion shown in FIG. 3.

FIG. 5 is a block diagram showing an electrical configuration of the bicycle components of the bicycle shown in FIG. 1.

DETAILED DESCRIPTION OF EMBODIMENTS

Selected embodiments will now be explained with reference to the drawings. It will be apparent to those skilled in the bicycle field from this disclosure that the following descriptions of the embodiments are provided for illustration only and not for the purpose of limiting the invention as defined by the appended claims and their equivalents.

As shown in FIG. 1, a bicycle 10 includes a bicycle body 12, a frame 14, a front wheel 16, a rear wheel 18, a handlebar 20, a crank 22, front sprockets 24A, rear sprockets 24B, a chain 26, a battery 28 and a bicycle control assembly 30.

The bicycle body 12 includes a front fork 12A. The frame 14 includes a head tube 14A, a seat tube 14B, a bottom bracket 14C, a down tube 14D, a chainstay 14E, a rear end 14F, a seatstay 14G and a derailleur hanger 14H.

The front wheel 16 includes a wheel 16A and a hub axle 16B. The hub axle 16B is supported by the front fork 12A. The handlebar 20 is coupled to the head tube 14A. The rear wheel 18 includes a wheel 18A and a hub axle 18B. The hub axle 18B is supported by the rear end 14F.

The crank 22 is coupled to the bottom bracket 14C. The crank 22 is rotated by pedaling force of the user. The front sprockets 24A are coupled to the crank 22. The rear sprockets 24B are coupled to the hub axle 18B of the rear wheel 18. The chain 26 runs around the front sprockets 24A and the rear sprockets 24B. The front sprockets 24A are rotated together with the crank 22. The rotation of the front sprockets 24A is transmitted to the rear sprockets 24B by the chain 26 to rotate the rear sprockets 24B and the rear wheel 18.

The battery 28 is coupled to the down tube 14D. The battery 28 supplies power to the bicycle control assembly 30. The battery 28 is connected to the bicycle control assembly 30 by a power cable (not shown).

The bicycle control assembly 30 includes an electric assist unit 32, an electric suspension 34, an electric adjustable seatpost 36, a cycle computer 38, an electric front derailleur 40, an electric rear derailleur 42 and an operation device 50.

The electric assist unit 32 includes an actuator 32A and an electronic controller 32B. The electronic controller 32B includes one or more processors and one or more memory devices. The processor(s), which executes predetermined control programs, includes, for example, a central processing unit (CPU) or a micro processing unit (MPU). The memory device(s) stores information used in various kinds of control programs, the operation modes and various kinds of control processes. The electric assist unit 32 drives the actuator 32A to assist rotation of the crank 22. One example of the actuator 32A is an electric motor. Rotation produced by the actuator 32A is transmitted to the front sprockets 24A via a reduction gear (not shown). In one example, a one-way clutch is arranged between the actuator 32A and the front sprockets 24A. The one-way clutch avoids transmission of the pedaling force, which is applied to the crank 22 by the user, to the actuator 32A. The electric assist unit 32 functions in multiple operation modes having different assist ratios. The user operates the cycle computer 38 to switch the operation modes of the electric assist unit 32.

The electric suspension 34 is arranged on the front fork 12A. The electric suspension 34, which includes an elastic body (not shown), absorbs a shock applied to the front wheel 16 by converting the shock into elastic energy. One example of the elastic body is a cylinder that encloses a spring, air, oil, and a fluid including a magnetic fluid or the like. The electric suspension 34 supports the front wheel 16 so that the position of the front wheel 16 is changeable relative to the front fork 12A. The operation state of the electric suspension 34 is changed, for example, by an actuator 34A. One example of the actuator 34A is an electric motor. The actuator 34A is driven by power supplied from the battery 28. The operation state of the electric suspension 34 includes at least one of a moved state, the amount of travel, damping force, and repulsion force. In a case in which the user inputs an instruction for locking the electric suspension 34 in the moved state to the cycle computer 38, the electric suspension 34 is operated to lock the position of the front wheel 16 relative to the front fork 12A. In a case in which the user inputs an instruction for unlocking the electric suspension 34 from the moved state to the cycle computer 38, the electric suspension 34 is operated to unlock the position of the front wheel 16 relative to the front fork 12A.

The electric adjustable seatpost 36 is supported by the seat tube 14B. The electric adjustable seatpost 36 is partially inserted into the seat tube 14B. The operation state of the electric adjustable seatpost 36 is changed by an actuator 36A. One example of the actuator 36A is an electric motor. The actuator 36A is driven by power supplied from the battery 28. The operation state of the electric adjustable seatpost 36 includes the height of the electric adjustable seatpost 36. In a case in which the user operates the cycle computer 38 to drive the actuator 36A, the height of the electric adjustable seatpost 36 is changed.

The cycle computer 38 is arranged, for example, on the handlebar 20. The cycle computer 38 is connected to the electric assist unit 32, the electric suspension 34, and the electric adjustable seatpost 36 so that wired communication is performed using signal lines and/or power line communication (PLC). The cycle computer 38 includes an electronic controller 38A configured to communicate the electric assist unit 32, the electric suspension 34, and the electric adjustable seatpost 36. The electronic controller 38A includes one or more processors and one or more memory devices. The processor(s), which executes predetermined control programs, includes, for example, a central processing unit (CPU) or a micro processing unit (MPU). The

memory device(s) stores information used in various kinds of control programs, the operation modes and various kinds of control processes. Additionally, the cycle computer 38 includes a display 38B configured to show at least one of the operation mode of the electric assist unit 32, the operation mode of the electric suspension 34, the operation mode of the electric adjustable seatpost 36, the transmission position of the electric front derailleur 40, the transmission position of the electric rear derailleur 42, and the riding state of the bicycle 10.

The electric front derailleur 40 is an electric shift device. Preferably, the electric front derailleur 40 is coupled to the seat tube 14B. The electric front derailleur 40, which is driven by an actuator 40A, moves the chain 26 between the front sprockets 24A to change the transmission ratio of the bicycle 10.

The electric rear derailleur 42 is an electric shift device. Preferably, the electric rear derailleur 42 is coupled to the derailleur hanger 14H. The electric rear derailleur 42, which is driven by an actuator 42A, moves the chain 26 between the rear sprockets 24B to change the transmission ratio of the bicycle 10.

As shown in FIG. 2, the operation device 50 includes a first operation device 52 and a second operation device 54. The first operation device 52 is coupled, for example, to a right handlebar 20A. The first operation device 52 is connected to the electric rear derailleur 42 (refer to FIG. 1) to perform wireless communication with the electric rear derailleur 42. The second operation device 54 is coupled, for example, to a left handlebar 20B. The second operation device 54 is connected to the electric front derailleur 40 (refer to FIG. 1) to perform wireless communication with the electric front derailleur 40. The wireless communication signals from the first and second operation devices 52 and 54 can be radio frequency (RF) signals, ultra-wide band communication signals, or Bluetooth communications or any other type of signal suitable for wireless communications as understood in the bicycle field. Here, as discussed below, each of the first and second operation devices 52 and 54 includes a wireless communication device can be either a one-way wireless communication unit such as a transmitter or a two-way wireless communication unit such as a transceiver. However, the term "wireless communication device" as used herein includes a receiver, a transmitter, a transceiver, a transmitter-receiver, and contemplates any device or devices, separate or combined, capable of transmitting and/or receiving wireless communication signals, including shift signals or control, command or other signals related to some function of the component being controlled.

As shown in FIG. 3, the first operation device 52 includes a base 56, a fixing portion 58, a brake lever 60, a first operation member 62, a second operation member 64, a power generator 66, a communication device 68, an attachment portion 70, a cover member 72, an electronic controller 74, and a connection portion 78.

The base 56 includes an inner cavity 56A. The base 56 is coupled, for example, to the right handlebar 20A of the bicycle 10. The communication device 68 and the electronic controller 74 are located in the inner cavity 56A. The base 56 further includes a grip 56C, which is held by the user.

The fixing portion 58 couples the base 56 and the right handlebar 20A. The bicycle 10 includes a rear brake 10B (refer to FIG. 1), which is connected to the brake lever 60 by a wire (not shown). The brake lever 60 is coupled to the base 56 and rotatable about a rotation shaft 56B. The brake lever 60 is biased away from the right handlebar 20A by a coil spring (not shown). In a state in which the user rotates the

brake lever 60 about the rotation shaft 56B so that the brake lever 60 is moved closer to the right handlebar 20A, the rear brake 10B holds the rear wheel 18 in between.

The first operation member 62 includes an operation portion 62A and a switch 62B. The operation portion 62A is pushed by the user. The switch 62B is connected to the electronic controller 74 to perform wired or wireless communication, as mentioned above, with the electronic controller 74. In a case in which the user pushes the operation portion 62A, the switch 62B transmits an operation detection signal to the electronic controller 74.

The second operation member 64 includes an operation portion 64A and a switch 64B. The operation portion 64A is pushed by the user. The switch 64B is connected to the electronic controller 74 to perform wired or wireless communication with the electronic controller 74. In a case in which the user pushes the operation portion 64A, the switch 64B transmits an operation detection signal to the electronic controller 74.

The power generator 66 is located, for example, in the brake lever 60. The power generator 66 is connected to the electronic controller 74 by the connection portion 78. The power generator 66 generates power, for example, in a case in which the first operation member 62 or the second operation member 64 is operated. The power generator 66 includes a piezoelectric element 66A. In a case in which the user operates the operation portion 62A or the operation portion 64A, the operation portion 62A or the operation portion 64A is pressed onto the piezoelectric element 66A. Consequently, the piezoelectric element 66A generates power. Japanese Laid-Open Patent Publication No. 2006-351267 describes a power generator, which is one example of the power generator 66 including the piezoelectric element 66A.

As shown in FIG. 4, the communication device 68 includes a communication device body 68A and a transmission circuit 68B such as a PLC circuit or a wireless communication circuit. The communication device 68 transmits a wireless signal with the power generated by the power generator 66. The wireless signal is a signal that controls the operation of the bicycle control assembly 30 including the actuators 32A, 34A, 36A, 40A and 42A. The wireless signal includes, for example, a shift up signal and a shift down signal. The shift up signal increases the transmission ratio of the bicycle 10. The shift down signal decreases the transmission ratio of the bicycle 10. The communication device 68 is separated from the power generator 66 (refer to FIG. 3). The communication device 68 is attached to the attachment portion 70 so that the communication device 68 is at least partially exposed from the attachment portion 70.

The communication device body 68A includes a housing 68C. The housing 68C is card-shaped. The transmission circuit 68B is arranged in the housing 68C. The electric rear derailleur 42 includes an electronic controller 42B, which receives the shift up signal or the shift down signal from the transmission circuit 68B.

The communication device 68 is attached to the attachment portion 70 in a removable manner. The attachment portion 70 is arranged in the base 56 so that the communication device 68 is at least partially located in the inner cavity 56A of the base 56. In a state in which the base 56 is coupled to the right handlebar 20A of the bicycle 10, the attachment portion 70 is located at a side of the base 56 that is closer to a center XA (refer to FIG. 2) of the bicycle 10. The attachment portion 70 includes a recess 80 and two member attachment holes 82.

The recess **80** is a card slot into which the communication device **68** is insertable. The two member attachment holes **82** are located above and below the opening of the recess **80**. The member attachment holes **82** are not connected to the inner cavity **56A** of the base **56**.

In a state in which the communication device **68** is inserted in the recess **80**, the cover member **72** is attached to the base **56** to cover the communication device **68**. The cover member **72** includes a resin material. In one example, the entire cover member **72** is formed from a resin material. The cover member **72** includes a main portion **72A** and two fixing portions **72B**.

The main portion **72A** extends in a direction in which short sides of the communication device body **68A** extend. The two fixing portions **72B** extend toward the base **56** from one of longitudinal ends of the main portion **72A**. In a state in which the two fixing portions **72B** of the cover member **72** are inserted into the two member attachment holes **82**, the cover member **72** is fixed to the base **56**.

The electronic controller **74** includes one or more processors and one or more memory devices. The processor(s), which executes predetermined control programs, includes, for example, a central processing unit (CPU) or a micro processing unit (MPU). The memory device(s) stores information used in various kinds of control programs, the operation modes and various kinds of control processes. As shown in FIG. 5, the electronic controller **74** is connected to the communication device **68** to perform wired or wireless communication with the communication device **68**. In a case in which the operation detection signal is received from the switch **62B**, the electronic controller **74** transmits a shift up request signal to the communication device **68**. The transmission circuit **68B** of the communication device **68** transmits the shift up signal to the electronic controller **42B** of the electric rear derailleur **42** based on the input of the shift up request signal. The electronic controller **42B** operates the actuator **42A** to increase the transmission ratio of the bicycle **10** based on the shift up signal.

In a case in which the operation detection signal is received from the switch **64B**, the electronic controller **74** transmits a shift down request signal to the communication device **68**. The transmission circuit **68B** of the communication device **68** transmits the shift down signal to the electronic controller **42B** of the electric rear derailleur **42** based on the input of the shift down request signal. The electronic controller **42B** operates the actuator **42A** to decrease the transmission ratio of the bicycle **10** based on the shift down signal.

The connection portion **78** electrically connects the communication device **68** and the power generator **66**. One example of the connection portion **78** is a power cable. The connection portion **78** includes a first connection portion **78A** and a second connection portion **78B**. The first connection portion **78A** connects the power generator **66** and the electronic controller **74**. The second connection portion **78B** connects the electronic controller **74** and the communication device **68**.

FIG. 2 shows the second operation device **54**, which is one example of another bicycle component. The second operation device **54** and the first operation device **52** have the same structure. The second operation device **54** is coupled, for example, to the left handlebar **20B**. The second operation device **54** includes a brake lever **96**. The bicycle **10** includes a front brake **10A** (refer to FIG. 1), which is connected to the brake lever **96** by a wire (not shown). The second operation device **54** is connected to the electric front derailleur **40** (refer to FIG. 1) to perform wireless commu-

nication with the electric front derailleur **40**. The second operation device **54** includes an attachment portion **90**, which has the same structure as the attachment portion **70** of the first operation device **52**. The communication device **68** is attached to the attachment portion **90** of the second operation device **54** in a removable manner. The attachment portion **90** of the second operation device **54** is one example of another attachment portion of another bicycle component.

The second operation device **54** includes a first operation member **92**, which includes an operation portion **92A**, and a second operation member **94**, which includes an operation portion **94A**. The electric front derailleur **40** includes an electronic controller **40B**. In a case in which the user operates the operation portion **92A** of the first operation member **92** with the communication device **68** attached to the attachment portion **90**, the communication device **68** transmits the shift down signal to the electronic controller **40B** (refer to FIG. 1) of the electric front derailleur **40**. Also, in a case in which the user operates the operation portion **94A** of the second operation member **94** with the communication device **68** attached to the attachment portion **90**, the communication device **68** transmits the shift up signal to the electronic controller **40B** of the electric front derailleur **40**.

Modified Examples

The bicycle component and the communication device of the bicycle component are not limited to the embodiments described above. The bicycle component and the communication device may be embodied in other modes. Examples of other modes of the bicycle component and the communication device include modified examples described below.

In a modified example of the bicycle control assembly **30**, the cycle computer **38** includes an attachment portion having the same structure as the attachment portion **70**. In this modified example of the bicycle control assembly **30**, the communication device **68** transmits a wireless signal for controlling operation to at least one of the electric assist unit **32**, the electric suspension **34**, and the electric adjustable seatpost **36**.

In a modified example of the bicycle control assembly **30**, at least one of the electric assist unit **32**, the electric suspension **34**, and the electric adjustable seatpost **36** includes an attachment portion having the same structure as the attachment portion **70**. In this modified example of the bicycle control assembly **30**, the communication device **68** includes a reception circuit. The communication device **68** receives a wireless signal from the cycle computer **38** with the reception circuit.

In a modified example of the bicycle control assembly **30**, the communication device **68** is connected to the battery **28** by a power cable. In this modified example, the communication device **68** transmits a wireless signal with the power supplied from the battery **28**.

In a modified example of the bicycle control assembly **30**, the base **56** of the operation device **50** does not include the grip **56C**. This modified example of the bicycle control assembly **30** is, for example, a shift operation device coupled to a mountain bike.

In a modified example of the bicycle control assembly **30**, the attachment portion **70** is a bracket arranged on a surface of the base **56** and having a shape configured to support the communication device **68**. In this modified example, in a state in which the communication device **68** is attached to the attachment portion **70**, the communication device **68** is partially or entirely exposed from the base **56**.

In understanding the scope of the present invention, the term “comprising” and its derivatives, as used herein, are intended to be open ended terms that specify the presence of the stated features, elements, components, groups, integers, and/or steps, but do not exclude the presence of other unstated features, elements, components, groups, integers and/or steps. The foregoing also applies to words having similar meanings such as the terms, “including”, “having” and their derivatives. Also, the terms “part,” “section,” “portion,” “member” or “element” when used in the singular can have the dual meaning of a single part or a plurality of parts unless otherwise stated. Also, it will be understood that although the terms “first” and “second” may be used herein to describe various components these components should not be limited by these terms. These terms are only used to distinguish one component from another. Thus, for example, a first component discussed above could be termed a second component and vice versa without departing from the teachings of the present invention. Finally, terms of degree such as “substantially”, “about” and “approximately” as used herein mean an amount of deviation of the modified term such that the end result is not significantly changed.

The foregoing descriptions of the embodiments according to the present invention are provided for illustration only, and not for the purpose of limiting the invention as defined by the appended claims and their equivalents.

What is claimed is:

1. A control assembly for a bicycle comprising:
 - a first operation device coupled to a first handlebar of a bicycle; and
 - a second operation device coupled to a second handlebar of the bicycle, each of the first operation device and the second operation device comprising:
 - a base attached to the bicycle;
 - an operation member;
 - a communication device that transmits a wireless signal; and
 - an attachment portion removably attached to the communication device, the attachment portion being arranged in the base,
- the communication device of the first operation device being attachable in a removable manner to the attachment portion of the first operation device and the attachment portion of the second operation device.
2. The control assembly for a bicycle according to claim 1, wherein
 - the attachment portion of the first operation device includes a recess into which the communication device is insertable.
3. The control assembly for a bicycle according to claim 2, wherein
 - the communication device is configured to be attached to the attachment portion of the first operation device so that the communication device is at least partially exposed from the attachment portion of the first operation device.
4. The control assembly for a bicycle according to claim 1, wherein:
 - the base includes an inner cavity with the communication device being at least partially located in the inner cavity by the attachment portion of the first operation device.
5. The control assembly for a bicycle according to claim 1, further comprising:
 - a cover member attached to the base, the cover member covering the communication device.

6. The control assembly for a bicycle according to claim 5, wherein
 - the cover member includes a resin material.
7. The control assembly for a bicycle according to claim 1, wherein
 - the base is coupled to a handlebar of a bicycle.
8. The control assembly for a bicycle according to claim 7, wherein
 - in a state in which the base is coupled to the handlebar of the bicycle, the attachment portion of the first operation device is located at a side of the base that is closer to a center of the bicycle.
9. The control assembly for a bicycle according to claim 1, wherein
 - the communication device includes a transmission circuit that transmits the wireless signal, and a communication device body that includes the transmission circuit.
10. The control assembly, for a bicycle according to claim 9, wherein
 - the attachment portion of the first operation device includes a card slot, and
 - the communication device body is a card shaped member that is insertable into the card slot.
11. The control assembly for a bicycle according to claim 9, wherein
 - the communication device body includes a housing, and the transmission circuit is arranged in the housing.
12. The control assembly for a bicycle according to claim 1, wherein
 - the wireless signal of the communication device controls an actuator of an electrical device.
13. The control assembly for a bicycle according to claim 12, wherein
 - the electrical device is selected from the group consisting of: an electric shift device, an electric adjustable seat-post, an electric suspension and an electric assist unit.
14. The control assembly for a bicycle according to claim 1, wherein
 - each of the first operation device and the second operation device further comprise a power generator connected to the communication device.
15. The control assembly for a bicycle according to claim 14, wherein
 - the power generator includes a piezoelectric element.
16. The control assembly for a bicycle according to claim 14, further comprising:
 - a connection portion that electrically connects the communication device and the power generator,
 - the communication device being arranged separate from the power generator.
17. A communication device that transmits or receives a wireless signal, wherein
 - the communication device is removably attachable to both a first attachment portion arranged in a first base of a first operation device attached to a bicycle and to a second attachment portion arranged in a second base of a second operation device attached to the bicycle.
18. The communication device according to claim 17, wherein
 - the second operation device includes an actuator, and the wireless signal of the communication device controls the actuator.
19. The communication device according to claim 18, wherein
 - each of the first attachment portion and the second attachment portion includes a recess into which the communication device is insertable.

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20. The communication device according to claim 19,
wherein
the communication device is a card shaped member.

21. The communication device according to claim 17,
wherein

the communication device is removably attachable to a
third attachment portion arranged in a cycle computer.

22. A control system for a bicycle comprising:

a cycle computer;

an operation device; and

an electric device selected from the group consisting of an
electric assist unit, an electric suspension, and an
electric adjustable seatpost,

each of the cycle computer and the operation device
comprising a communication unit that is interchange-
able between the cycle computer and the operation
device, wherein the electric device is operated based on
a wireless signal from the communication unit.

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